DPON / DOCSIS PON

Optical Node Unit (CPE) for RFoG networks

About the Product

The Light Link® Direct DPON is the Optical Node Unit (ONU) for new "RFoG" (RF over Glass) Fibre-to-the-Home (FTTH) architecture, and is optimized to work over PON standards-compliant FTTH networks. The Society of Cable Telecommunications Engineers has issued their standard document IPS SP 910 to cover the subject and set implementation guidelines

Rolling out RFoG makes it possible for a cable operator to continue the deployment of DOCSIS-compliant cable modems for Internet and Telephony delivery, together with Video on Demand systems which need an RF return path to operate. The DPON optical node looks just like an HFC network for all of the traditional customer premises equipment.

The DPON is designed for 1550 nm forward-path RF signals, with return-path RF signals converted to optical at either 1310 nm or 1610 nm in a 1 x 32 split FTTH network topology.

The DPON incorporates an isolated DFB optical laser to modulate the return-path signal from any RF set-top box or DOCSIS modem onto the fibre. The photodiode featured on the duplex model provides a 1550 nm CATV receiver with a forward path frequency response up to 1003 MHz. An optional CWDM combines these forward and return-path signals across a 1310/1490 nm EPON/GPON network, offering a transitional platform to migrate existing HFC two-way STB and DOCSIS modem technology to PON FTTH.

Employing leading edge system design, the DPON is a must-have in any FTTx/CATV solution. The power of having a Passive Optical Network (PON), but still allowing an RF overlay, offers a multi-functional PON delivering more services over the same infrastructure.

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Features

- Suitable for transmission of PAL and NTSC analogue TV channels as well as DVB-C and DVB-T digital television standards.
- Active Carrier Suppression (ACS) to allow up to 32 units to function within a PON HFC network compatible with DOCSIS 1, 2 or 3 standards, and with SCTE-standards ISP SP 910 for RFoG.
- In-built return path transmitter suits set-top box systems where pay-per-view and other various return path information is sent via RF.
- Powered directly using the power socket or via the F-type connectors.
- The compact and sturdy enclosure fits easily in wiring closets or network termination boxes.
- Specifically designed to be SCTE ISP SP-910 standards compliant.

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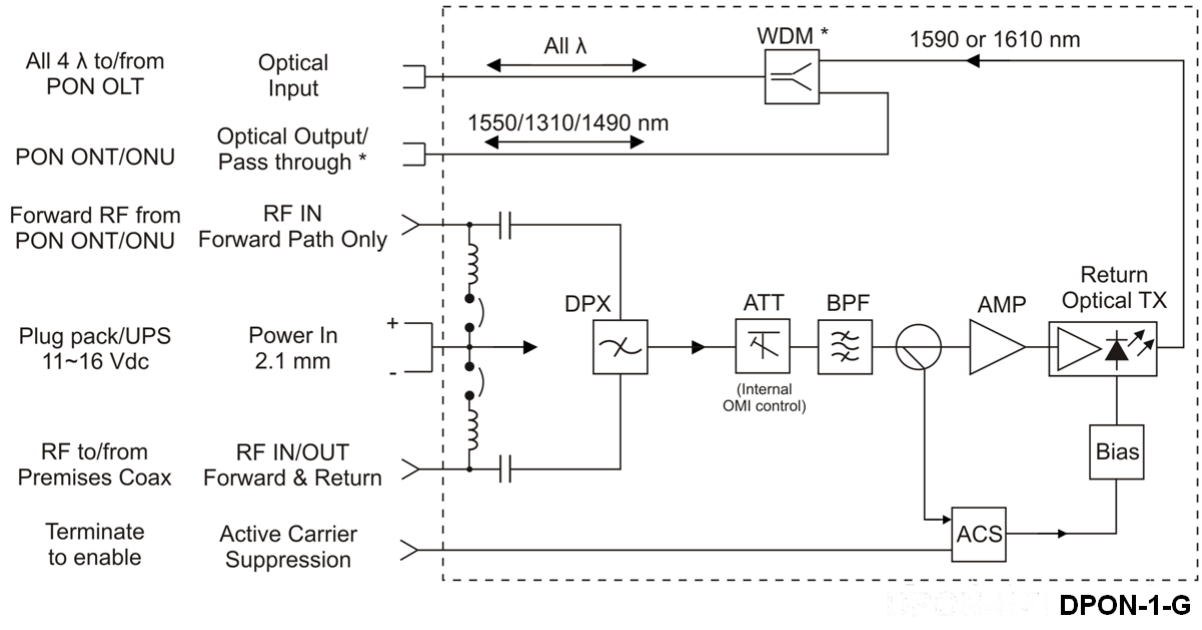
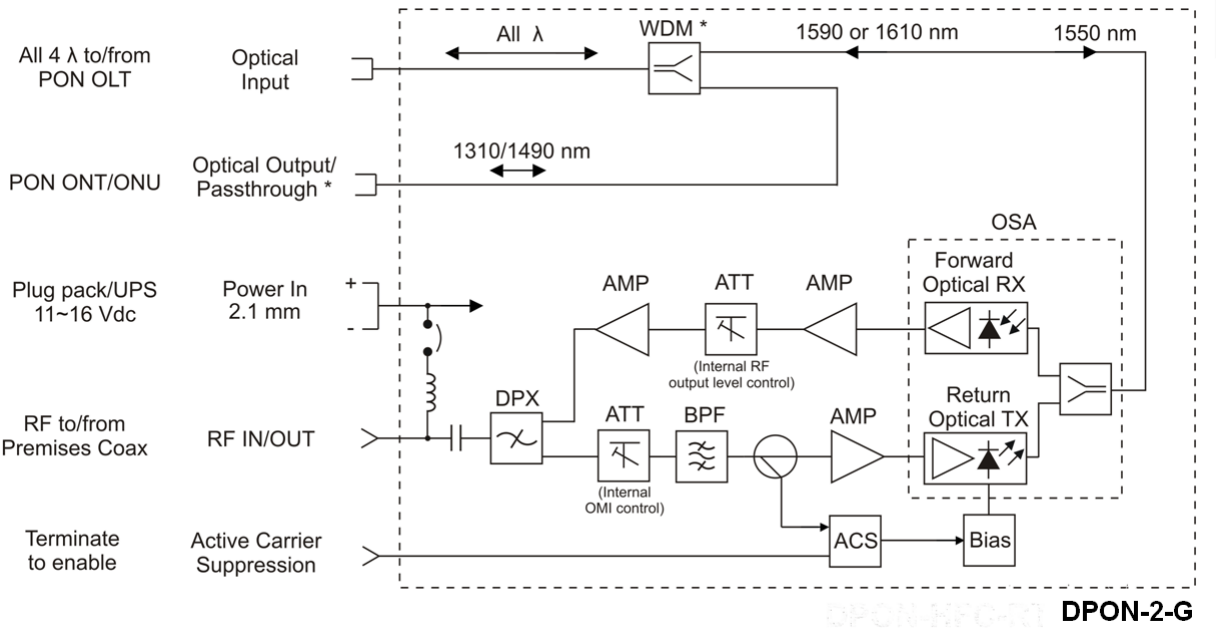
Block Diagrams





** 1310/1490 nm pass-through only featured on models ordered with option [X] = G.*

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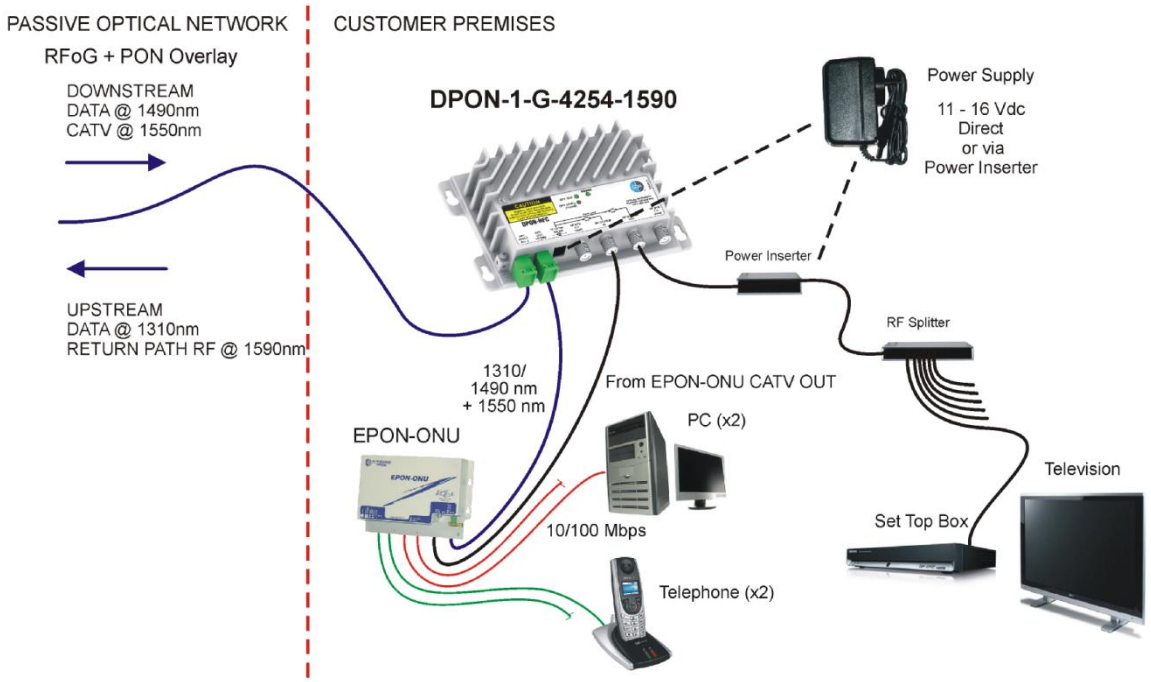
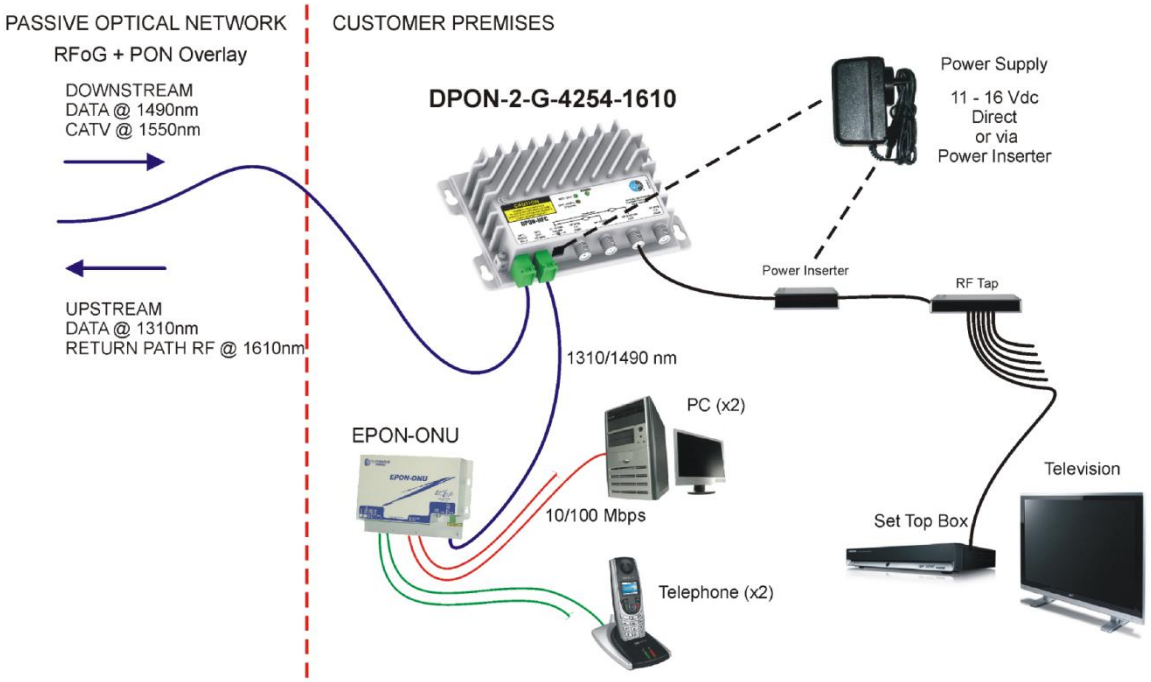
Typical Application Examples





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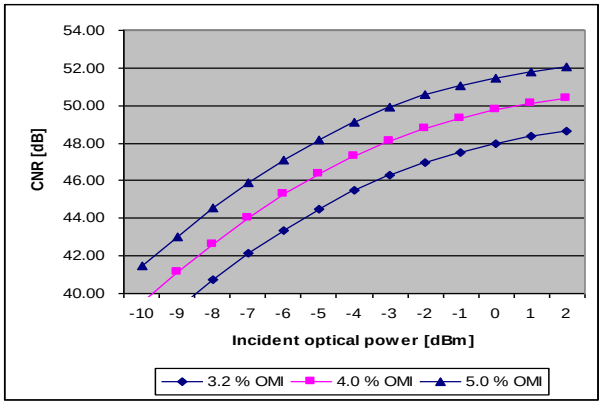
Specifications

Forward Path Optical

Wavelength:	1550 nm *(Option [W] = 2 only)*
Pass-through:	1310/1490 nm *(Option [X] = G only)*
Input level:	-8 dBm to 0 dBm Nominal network design input level: -5 dBm
Optical input return loss:	> 45 dB
Optical input level test point:	1 V / mW *(Option [W] = 2 only)*

Forward Path RF (option [W] = 2 only)

RF output level:	20 dBmV (1)
Output level adjustment:	± 10 dB
RF bandwidth	
DPON-2-[X]-4254-[Z]	54 ~ 1003 MHz
DPON-2-[X]-6585-[Z]	85 ~ 1003 MHz
RF flatness:	± 1.5 dB over 54 ~ 860Mhz. Additional < 2dB drop over 860 ~ 1003Mhz
RF slope:	3 ± 1 dB
RF output return loss:	> 14 dB
RF output test point:	-20 dB
CNR:	> 46 dB
CSO:	< -60 dBc
CTB:	< -60 dBc



Forward Path CNR (1) (Option [W] = 2)

(1) Measured in a typical 1550 nm transmission system with PBN LTM15 optical transmitter and 5 km of single-mode fibre to the DPON, aligned for the recommended nominal optical input power of -5 dBm, with 42 Cenelec carriers and 4% OMI.

Relative Noise Bandwidth (RNB) 5 MHz for PAL television channels. CNR performance for NTSC television channels with 4 MHz RNB is 1 dB better.

Through loss for 1310 and 1490 nm is less than 1 dB.

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Specifications (continued)

Return Path Optical

Wavelength	
DPON-[W]-[X]-[0]-1310:	1310 nm
DPON-[W]-[X]-[Y]-1610:	1610 nm
Output level:	> 1 mW (0 dBm) (2)
Connectors:	SC/APC
Return loss:	> 45 dB
Output power test point:	1 mW / V

Return Path RF

RF bandwidth	
DPON-[W]-[X]-4254-[Z]:	5 ~ 42 MHz
DPON-[W]-[X]-6585-[Z]:	5 ~ 65 MHz
RF flatness:	± 1dB
RF input return loss:	> 14 dB
RF input test point:	-20 dB
RF input range:	20~50 dBmV (3)
RF threshold for ACS:	< 15 dBmV

General Specifications

Power supply	11 ~ 16 Vdc (4)
DPON-1-[X]-[Y]-[Z]:	200 mA @ 12 Vdc
DPON-2-[X]-[Y]-[Z]:	450 mA @ 12 Vdc
Optical connectors:	SC/APC
Power/RF connectors:	SCTE - F-type
Power connector:	2.1 mm DC socket
Operating temperature:	-40 °C ~ +60 °C
Operating humidity	Relative humidity 5 ~ 95% Non-Condensing
Dimensions: (H x W x D)	115 x 163 x 38 mm
Unit weight:	0.38 kg
Power supply weight:	0.22 kg
Ship dimensions: (Pack of 10)	17 x 53 x 38 cm (35 dm3)
Ship weight: (Pack of 10)	7.7 kg (5)

(2) With Active Carrier Suppression enabled, laser optical power level is < -15dBm when no RF input signal is applied.

(3) Internal Adjustment optioned for installer. Factory set at 10% OMI with a 30 dBmV input.

(4) A universal mains plug-pack is supplied with the DPON unit. The plug-pack is suitable for 95 ~ 265 Vac 50 ~ 60 Hz and has mains pins for AU/CN/EU/UK/US.

(5) DPON optical receivers are supplied in bulk pack cartons. Individual packaging can be provided by request at additional costs.

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Order Details

DPON-[W]-[X]-[Y]-[Z] Customer premises optical node for RFOG

W
- 1 Transmitter for RF return path only
- 2 Full-duplex unit with CATV forward-path receiver on 1551 nm and return-path transmitter with optical wavelength specified in [Z].

X
- 0 No optical bypass port
- G Optical bypass port for external EPON or GPON ONU on 1310/1490 nm

Y
- 4254 5~42/54~1003 MHz RF diplexer
- 6585 5~65/85~1003 MHz RF diplexer

Z Optical Laser Transmitter for RF return path
- 1310 Isolated DFB laser 1310 nm > 1 mW (0 dBm) (6)
- 1610 Isolated DFB laser 1610 nm > 1 mW (0 dBm) *(preferred optical wavelength)*

(6) Only available for models without EPON or GPON overlay (i.e. Option [X] =0).

Examples

DPON-2-0-4254-1610 Customer premises equipment, providing a forward path 54~1003 MHz @ 1550 nm and a return path 5~42 MHz @ 1610 nm. Ships with PS121500-UN universal mains plug-packs. Sold in bulk cartons of ten units.

DPON-2-G-6585-1610 Customer premises equipment, providing a forward path 85~1003 MHz @ 1550 nm and a return path 5~65 MHz @ 1610 nm, with 1310/1490 nm pass-through for PON overlay. Ships with a PS121500-UN universal mains plug-pack. Sold in bulk cartons of ten units.

DPON-2-G-6585-1610 Customer premises equipment, providing a forward path 85~1003 MHz @ 1550 nm and a return path 5~65 MHz @ 1610 nm, with 1310/1490 nm pass-through for PON overlay. Ships with a PS121500-UN universal mains plug-pack. Sold in bulk cartons of ten units.

Model	RF return transmitter	RF diplexer	CATV receiver	Optical pass-through
DPON-1-0-4254-1310	*1310 nm*	*5~42 MHz / 54~1003 MHz*	-	-
DPON-1-0-4254-1610	1610 nm	5~42 MHz / 54~1003 MHz	-	-
DPON-1-0-6585-1310	*1310 nm*	*5~65 MHz / 85~1003 MHz*	-	-
DPON-1-0-6585-1610	1610 nm	5~65 MHz / 85~1003 MHz	-	-
DPON-1-G-4254-1610	1610 nm	5~42 MHz / 54~1003 MHz	-	1310 / 1490 / 1550 nm
DPON-1-G-6585-1610	1610 nm	5~65 MHz / 85~1003 MHz	-	1310 / 1490 / 1550 nm
DPON-2-0-4254-1310	*1310 nm*	*5~42 MHz / 54~1003 MHz*	*1550 nm*	-
DPON-2-0-4254-1610	1610 nm	5~42 MHz / 54~1003 MHz	1550 nm	-
DPON-2-0-6585-1310	*1310 nm*	*5~65 MHz / 85~1003 MHz*	*1550 nm*	-
DPON-2-0-6585-1610	1610 nm	5~65 MHz / 85~1003 MHz	1550 nm	-
DPON-2-G-4254-1610	1610 nm	5~42 MHz / 54~1003 MHz	1550 nm	1310 / 1490 nm
DPON-2-G-6585-1610	1610 nm	5~65 MHz / 85~1003 MHz	1550 nm	1310 / 1490 nm

Grey Italic listed items not recommended for Greenfield deployments. Select a bold-printed model instead.

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Accessories

PS121500-UN	Universal mains plug-pack, 95~265 Vac 50~60 Hz to 12 Vdc 1.5 A, with moulded 2.1 mm DC connector and interchangeable mains pins for AU/CN/EU/UK/US. *(DPON does ship with a PS121500-UN mains plug-pack as an inclusion. Available as a spare part)*
OSF-19-1x32-SC	Optical splitter in 19" sub-rack 1RU, 32 ports, SC/APC.
OSF-19-1x32-SC-R61	CWDM for HFC return path 1611 nm with 32 port optical splitter in 19" sub-rack 1RU, SC/APC connectors.
OSF-19-1x32-SC-RFOG	CWDM for CATV forward path 1551 nm with 32 port optical splitter in 19" sub-rack 1RU, SC/APC connectors.
RPQRM-SC-RFOG	Return-path quad receiver module. Optimized for RFoG systems.
OWDM-3RFOG-SC	Optical multiplexer module for 3 x RFoG injection filters with 1551 nm forward path port and broadband by-pass.
OWDM-3RFOG61-SC	Optical multiplexer module for 3 x RFoG injection filters with 1611 nm return path port and broadband by-pass.
OWDM-RFOG59-SC	Optical multiplexer module with 2 x (1551 nm, 1590 nm & PON bypass).
OWDM-RFOG61-SC	Optical multiplexer module with 2 x (1551 nm, 1610 nm & PON bypass).

For more information

Contact PBN for further information.

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PBN is an ISO 9001:2008 Quality certified and C-Tick compliant company.

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